

### SUPPORT FOR THE AMENDMENTS

This Amendment amends the specification to correct a typographical error; cancels Claims 36 and 42; amends Claims 35 and 43-44; and adds new Claim 49. Support for the amendments is found in the specification and claims as originally filed.

The specification at page 14, line 3 is amended by replacing "22 weight%" with --32 weight%--. The glass powder used in sample 3 is a mixed powder consisting of fine particles and coarse particles. As described in the specification at page 4, lines 11-14, the coarse particles constitute the balance of the fine particles in the silica glass powder. As shown by the content of fine particles constituting 68 weight%, 22 weight % of coarse particles is a typographical error and should be 32 weight %.

Support for Claim 35 is found in canceled Claims 36 and 42 and in the specification at least at page 14, lines 1-2 ("... the fine particle having the particle size of less than 10  $\mu\text{m}$  of **68 weight %** ..."). Support for Claim 44 is found in the Claim 44 units " $\text{mg}/\text{cm}^2$ ". Support for new Claim 49 is found in the specification at least at page 13, lines 13-14 ("... the coarse particle having the particle size larger than 10  $\mu\text{m}$  of **42 weight %**"). No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 35, 37-41 and 43-49 will be pending in this application. Claim 35 is independent.

### REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

Claims 35 and 37 are rejected under 35 U.S.C. §102(b) over U.S. Patent No. 4,713,104 ("Brown").

Claims 35, 37 and 48 are rejected under 35 U.S.C. §103(a) over JP 2000-335998 ("Wakita").

Claims 35, 37-41 and 45-47 are rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,976,247 ("Hansen") in view of U.S. Patent No. 6,106,610 ("Watanabe").

Claims 36, 42-44 and 46-47 are rejected under 35 U.S.C. §103(a) over Hansen in view of Watanabe and further in view of U.S. Patent No. 5,389,582 ("Loxley").

Claims 36, 42-44 and 46-47 are rejected under 35 U.S.C. §103(a) over Brown in view of Loxley.

The Office Action at section 9, lines 5-11, and section 10, lines 5-10, relies on Loxley for suggesting "the claimed silica particle size".

Loxley discloses cristobalite-seeded quartz glass crucibles produced from a quartz refractory composition consisting essentially of milled particles of fused quartz with an average particle size from 1 to 8 microns and a minute amount of particles of a special crystallization aid having an average particle size of from 1 to 8 microns. Loxley at abstract; column 6, lines 20-26.

However, the cited prior art fails to suggest the combination of fine and coarse particles found in the silica glass powder layer of independent Claim 35. In particular, the cited prior art fails to suggest the independent Claim 35 limitations that "silica glass powder of the silica glass powder layer comprises fine silica particles and coarse silica particles, the fine silica glass particles constitute **more than 20 weight % to 68 weight %** of all the silica glass powder and have particle size **smaller than 10  $\mu\text{m}$** , and the coarse silica glass particles constitute **the remaining silica glass powder** and have particle size from **10  $\mu\text{m}$  to smaller than 150  $\mu\text{m}$** ". The combination of coarse and fine particles reduces the occurrence of cracks during sintering.

The quartz glass powder is shrunk at the time of the sintering in general. However, as for the quartz glass powder layer comprising the coarse and fine particles, since the shrinkage percentage can be controlled to several %, it is possible to form the uniform crystal phase have **no crack**. On the other hand, when the silica glass powder layer is formed by the powder having narrow particle size distribution, that is, the almost particle has the same size even when the particle size is less than 10  $\mu\text{m}$ , **cracks are aroused** because said silica glass powder layer is shrunk more than 10% by sintering under the high temperature, so that the strength is lower even when the layer is crystallized. Specification at page 7, lines 9-19 (emphasis added).

The specification at pages 12-16 (esp. page 16, lines 3-8) discloses in Sample 5 that when "fine particle each having the same particle diameter" (average particle size of 1  $\mu\text{m}$ ) were used to form a coating on quartz glass the coating experienced "countless crack" after heating.

Because the cited prior art fails to suggest the independent Claim 35 limitations that "silica glass powder of the silica glass powder layer comprises fine silica particles and coarse silica particles, the fine silica glass particles constitute **more than 20 weight % to 68 weight %** of all the silica glass powder and have particle size **smaller than 10  $\mu\text{m}$** , and the coarse silica glass particles constitute **the remaining silica glass powder** and have particle size from **10  $\mu\text{m}$  to smaller than 150  $\mu\text{m}$** ", the prior art rejections should be withdrawn.

Furthermore, the Office Action asserts that Brown suggests an outer coating of silica particles on the whole outside surface of the main body. However, an unfused and unsintered portion of the granular quartz particles remains as loose particles and does not constitute a crucible (column 3, lines 44-49). Although the sintered particles are adhered to the fused glass, there is no suggestion of the grain size distribution of the present application, since uniform particle size is generally preferred in the time of fusing the particles.

Hansen and Watanabe both describe the use of crystallization promoter (devitrification promoter) (e.g., abstracts). On the other hand, in the present application, by forming a silica glass powder layer having an appropriate grain size distribution, it is possible

to crystallize the powder layer in the time of using the crucible. Therefore, the use of crystallization promoter is not necessary in the present application.

In Watanabe, innermost portion of the crucible is made of a synthetic glass layer as a fused glass layer formed on the crystallization promoter layer (column 2, lines 30-34 and 47-51; column 4, lines 28-32). Therefore, a silica glass crucible of Claim 35, having a main body and a silica glass powder layer formed on a predetermined surface portion of the main body is not implied by Watanabe.

In Watanabe, crystallization promoter-containing layer (e.g., Ba-containing layer) provides crystallization nuclei to generate crystallization of a selective portion (column 3, lines 57-65). On the other hand, Loxley provides crystal (cristobalite) nuclei uniformly dispersed throughout the glass crucible (column 2, lines 53-55). Therefore, there is no motivation to combine Loxley with Watanabe.

Claim 44 is rejected under 35 U.S.C. § 112, second paragraph. To obviate the rejection, Claim 44 is amended to recite "an **area** density ... is more than 1 mg/cm<sup>2</sup>".

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 06/04)  
CPU/rac

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon



---

Corwin P. Umbach, Ph.D.  
Registration No. 40,211